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<120> RECOMBINANT PROTEIN CONTAINING A C-TERMINAL FRAGMENT OF PLASMODIUM MSP-1

<130> 0660-0135-0XCIP

<140> 09/134,333  
<141> 1998-08-14

<150> PCT/FR97/00290  
<151> 1997-02-14

<150> FR96/01822  
<151> 1996-02-14

<160> 15

<170> PatentIn version 3.1

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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu  
1 5 10 15  
aac tct ggc tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt 96  
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
20 25 30  
ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac 144  
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
35 40 45  
ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc 192  
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
50 55 60  
acc gag gag gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt 240  
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys



cctgattctt atccactttt cgatgggtatt ttctgcagt

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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu  
1 5 10 15  
aac tct ggc tgc ttc aga cac ttg gac gag aga gag gag tgt aaa tgt 96  
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
20 25 30  
ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac 144  
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
35 40 45  
ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc 192  
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
50 55 60  
acc gag gag gac tgc ggc agc aac ggc aag aaa atc acg tgt gag tgt 240  
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys  
65 70 75 80  
acc aaa ccc gac tgc tac ccg ctg ttc gac ggc atc ttc tgc agc tcc 288  
Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser  
85 90 95  
tct aac ttc ttg ggc atc tcg ttc ttg ttg atc ctc atg ttg atc ttg 336  
Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu  
100 105 110  
tac agc ttc att taa taa 354  
Tyr Ser Phe Ile  
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<212> PRT  
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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu  
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Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
 20 25 30

Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
 35 40 45

Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
 50 55 60

Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys  
 65 70 75 80

Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser  
 85 90 95

Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu  
 100 105 110

Tyr Ser Phe Ile  
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aacatttcac aacaccaatg cgtaaaaaaa caatgtccag aaaattctgg atgtttcaga 60

catttagatg aaagagaaga atgtaaatgt ttatttaaatt acaaacaaga aggtgataaa 120

tgtgttgaaa atccaaatcc tacttgtaac gaaaataatg gtggatgtga tgcagatgcc 180

aaatgtaccg aagaagattc aggtagcaac ggaagaaaa tcacatgtga atgtactaaa 240

cctgattctt atccactttt cgatgggtatt ttctgcagtt cctctaactt cttaggaata 300

tcattcttat taatactcat gttaatatata tacagtttca tt 342

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<213> Plasmodium falciparum

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<221> CDS

<222> (1) .. (387)

<223>

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atg aag gcg cta ctc ttt ttg ttc tct ttc att ttt ttc gtt acc aaa 48  
Met Lys Ala Leu Leu Phe Leu Phe Ser Phe Ile Phe Phe Val Thr Lys  
1 5 10 15

tgt caa tgt gaa aca gaa agt tat aag cag ctt gta gcc aac gtg gac 96  
Cys Gln Cys Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp  
20 25 30

gaa ttc aac atc tcg cag cac caa tgc gtg aaa aaa caa tgt ccc gag 144  
Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu  
35 40 45

aac tct ggc tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt 192  
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
50 55 60

ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac 240  
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
65 70 75 80

ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc 288  
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
85 90 95

acc gag gag gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt 336  
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys  
100 105 110

acc aaa ccc gac tcg tac ccg ctg ttc gac ggc atc ttc tgc agc taa 384  
Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
115 120 125

taa 387

<210> 8

<211> 127

<212> PRT

<213> Plasmodium falciparum

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Met Lys Ala Leu Leu Phe Leu Phe Ser Phe Ile Phe Phe Val Thr Lys  
1 5 10 15

Cys Gln Cys Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp  
20 25 30

Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu  
 35 40 45  
 Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
 50 55 60  
 Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
 65 70 75 80  
 Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
 85 90 95  
 Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys  
 100 105 110  
 Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
 115 120 125

<210> 9  
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 <213> Plasmodium falciparum  
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 gaa aca gaa agt tat aag cag ctt gta gcc aac gtg gac gaa ttc aac 48  
 Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp Glu Phe Asn  
 1 5 10 15  
 atc tcg cag cac caa tgc gtg aaa aaa caa tgt ccc gag aac tct ggc 96  
 Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly  
 20 25 30  
 tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt ctg ctg aac 144  
 Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn  
 35 40 45  
 tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac ccg acc tgt 192  
 Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys  
 50 55 60  
 aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc acc gag gag 240  
 Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu  
 65 70 75 80  
 gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt acc aaa ccc 288

Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro  
85 90 95

gac tcg tac ccg ctg ttc gac ggc atc ttc tgc agc taa taa  
Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
100 105

330

<210> 10  
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<213> Plasmodium falciparum

<400> 10

Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp Glu Phe Asn  
1 5 10 15

Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly  
20 25 30

Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn  
35 40 45

Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys  
50 55 60

Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu  
65 70 75 80

Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro  
85 90 95

Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
100 105

<210> 11  
<211> 379  
<212> PRT  
<213> Plasmodium cynomolgi

<220>  
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<222> (1)..(139)  
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<222> (140)..(177)

<223> REGION II

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<221> MISC\_FEATURE

<222> (178)..(282)

<223> REGION III

<220>

<221> MISC\_FEATURE

<222> (283)..(379)

<223> REGION IV

<400> 11

Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Ile  
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Val Pro Gln Gly Ile Asn Glu Tyr Asp Val Val Tyr Ile Lys Pro Leu  
20 25 30

Ala Gly Met Tyr Lys Thr Ile Lys Lys Pro Leu Glu Asn His Val Asn  
35 40 45

Ala Leu Asn Thr Asn Ile Ile Asp Met Leu Asp Ser Arg Leu Lys Lys  
50 55 60

Arg Asn Tyr Phe Leu Asp Val Leu Asn Ser Asp Leu Asn Pro Tyr Ser  
65 70 75 80

Ile Pro His Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu  
85 90 95

Asp Leu Glu Lys Lys Lys Leu Leu Gly Ser Tyr Lys Tyr Ile Gly Ala  
100 105 110

Ser Val Asp Lys Asp Met Val Thr Ala Asn Asp Gly Leu Ala Tyr Tyr  
115 120 125

Gln Lys Met Gly Asp Leu Tyr Lys Lys His Leu Asp Glu Val Asn Ala  
130 135 140

Cys Ile Lys Glu Val Glu Ala Asn Ile Asn Lys His Asp Glu Glu Ile  
145 150 155 160



Lys Lys Ile Gly Ser Glu Ala Ser Lys Ala Asn Asp Lys Asn Gln Leu  
 165 170 175  
 Asn Ala Lys Lys Glu Glu Leu Gln Lys Tyr Leu Pro Phe Leu Ser Ser  
 180 185 190  
 Ile Gln Lys Glu Tyr Ser Thr Leu Val Asn Lys Val His Ser Tyr Thr  
 195 200 205  
 Asp Thr Leu Lys Lys Ile Ile Asn Asn Cys Gln Ile Glu Lys Lys Glu  
 210 215 220  
 Thr Glu Thr Ile Val Asn Lys Leu Glu Asp Tyr Ser Lys Met Asp Glu  
 225 230 235 240  
 Glu Leu Asp Val Tyr Lys Gln Ser Lys Lys Glu Asp Asp Val Lys Ser  
 245 250 255  
 Ser Gly Leu Leu Glu Lys Leu Met Asn Ser Lys Leu Ile Asn Gln Glu  
 260 265 270  
 Glu Ser Lys Lys Ala Leu Ser Glu Leu Leu Asn Val Gln Thr Gln Met  
 275 280 285  
 Leu Asn Met Ser Ser Glu His Arg Cys Ile Asp Thr Asn Val Pro Glu  
 290 295 300  
 Asn Ala Ala Cys Tyr Arg Tyr Leu Asp Gly Thr Glu Glu Trp Arg Cys  
 305 310 315 320  
 Leu Leu Tyr Phe Lys Glu Asp Ala Gly Lys Cys Val Pro Ala Pro Asn  
 325 330 335  
 Met Thr Cys Lys Asp Lys Asn Gly Gly Cys Ala Pro Glu Ala Glu Cys  
 340 345 350  
 Lys Met Asn Asp Lys Asn Glu Ile Val Cys Lys Cys Thr Lys Glu Gly  
 355 360 365  
 Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser  
 370 375

<210> 12

<211> 380  
 <212> PRT  
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<220>  
 <221> MISC\_FEATURE  
 <222> (179)..(283)  
 <223> REGION III

<220>  
 <221> MISC\_FEATURE  
 <222> (284)..(380)  
 <223> REGION IV

<400> 12

Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu  
 1 5 10 15

Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu  
 20 25 30

Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn  
 35 40 45

Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys  
 50 55 60

Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys  
 65 70 75 80

Tyr Ser Pro Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu  
 85 90 95

Asp Leu Glu Lys Lys Lys Lys Leu Leu Gly Ser Tyr Lys Tyr Ile Gly  
 100 105 110

Ala Ser Ile Asp Lys Asp Leu Ala Thr Ala Asn Asp Gly Val Thr Tyr  
 115 120 125  
 Tyr Asn Lys Met Gly Glu Leu Tyr Lys Thr His Leu Thr Ala Val Asn  
 130 135 140  
 Glu Glu Val Lys Lys Val Glu Ala Asp Ile Lys Ala Glu Asp Asp Lys  
 145 150 155 160  
 Ile Lys Lys Ile Gly Ser Asp Ser Thr Lys Thr Thr Glu Lys Thr Gln  
 165 170 175  
 Ser Met Ala Lys Lys Ala Glu Leu Glu Lys Tyr Leu Pro Phe Leu Asn  
 180 185 190  
 Ser Leu Gln Lys Glu Tyr Glu Ser Leu Val Ser Lys Val Asn Thr Tyr  
 195 200 205  
 Thr Asp Asn Leu Lys Lys Val Ile Asn Asn Cys Gln Leu Glu Lys Lys  
 210 215 220  
 Glu Ala Glu Ile Thr Val Lys Lys Leu Gln Asp Tyr Asn Lys Met Asp  
 225 230 235 240  
 Glu Lys Leu Glu Glu Tyr Lys Lys Ser Glu Lys Lys Asn Glu Val Lys  
 245 250 255  
 Ser Ser Gly Leu Leu Glu Lys Leu Met Lys Ser Lys Leu Ile Lys Glu  
 260 265 270  
 Asn Glu Ser Lys Glu Ile Leu Ser Gln Leu Leu Asn Val Gln Thr Gln  
 275 280 285  
 Leu Leu Thr Met Ser Ser Glu His Thr Cys Ile Asp Thr Asn Val Pro  
 290 295 300  
 Asp Asn Ala Ala Cys Tyr Arg Tyr Leu Asp Gly Thr Glu Glu Trp Arg  
 305 310 315 320  
 Cys Leu Leu Thr Phe Lys Glu Glu Gly Gly Lys Cys Val Pro Ala Ser  
 325 330 335

Asn Val Thr Cys Lys Asp Asn Asn Gly Gly Cys Ala Pro Glu Ala Glu  
340 345 350

Cys Lys Met Thr Asp Ser Asn Lys Ile Val Cys Lys Cys Thr Lys Glu  
355 360 365

Gly Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser  
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<210> 13  
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Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu  
20 25 30

Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn  
35 40 45

Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys  
50 55 60

Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys  
 65 70 75 80  
 Tyr Ser Ser Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu  
 85 90 95  
 Asp Leu Glu Lys Lys Lys Lys Leu Ile Gly Ser Tyr Lys Tyr Ile Gly  
 100 105 110  
 Ala Ser Ile Asp Met Asp Leu Ala Thr Ala Asn Asp Gly Val Thr Tyr  
 115 120 125  
 Tyr Asn Lys Met Gly Glu Leu Tyr Lys Thr His Leu Asp Gly Val Lys  
 130 135 140  
 Thr Glu Ile Lys Lys Val Glu Asp Asp Ile Lys Lys Gln Asp Glu Glu  
 145 150 155 160  
 Leu Lys Lys Leu Gly Asn Val Asn Ser Gln Asp Ser Lys Lys Asn Glu  
 165 170 175  
 Phe Ile Ala Lys Lys Ala Glu Leu Glu Lys Tyr Leu Pro Phe Leu Asn  
 180 185 190  
 Ser Leu Gln Lys Glu Tyr Glu Ser Leu Val Ser Lys Val Asn Thr Tyr  
 195 200 205  
 Thr Asp Asn Leu Lys Lys Val Ile Asn Asn Cys Gln Leu Glu Lys Lys  
 210 215 220  
 Glu Ala Glu Ile Thr Val Lys Lys Leu Gln Asp Tyr Asn Lys Met Asp  
 225 230 235 240  
 Glu Lys Leu Glu Glu Tyr Lys Lys Ser Glu Lys Lys Asn Glu Val Lys  
 245 250 255  
 Ser Ser Gly Leu Leu Glu Lys Leu Met Lys Ser Lys Leu Ile Lys Glu  
 260 265 270  
 Asn Glu Ser Lys Glu Ile Leu Ser Gln Leu Leu Asn Val Gln Thr Gln  
 275 280 285

Leu Leu Thr Met Ser Ser Glu His Thr Cys Ile Asp Thr Asn Val Pro  
 290 295 300  
 Asp Asn Ala Ala Cys Tyr Arg Tyr Leu Asp Gly Thr Glu Glu Trp Arg  
 305 310 315 320  
 Cys Leu Leu Thr Phe Lys Glu Glu Gly Gly Lys Cys Val Pro Ala Ser  
 325 330 335  
 Asn Val Thr Cys Lys Asp Asn Asn Gly Gly Cys Ala Pro Glu Ala Glu  
 340 345 350  
 Cys Lys Met Thr Asp Ser Asn Lys Ile Val Cys Lys Cys Thr Lys Glu  
 355 360 365  
 Gly Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser  
 370 375 380

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 <223> REGION IV

914

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Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Val  
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Pro Gly Ile Tyr Asp Val Val Tyr Lys Pro Leu Ala Gly Met Tyr Lys  
20 25 30

Thr Ile Lys Lys Leu Glu Asn His Val Asn Ala Asn Thr Asn Ile Asp  
35 40 45

Met Leu Asp Ser Ala Leu Lys Lys Ala Asn Tyr Phe Leu Val Leu Asn  
50 55 60

Ser Asp Leu Asn Pro Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys  
65 70 75 80

Leu Leu Asp Leu Glu Lys Lys Lys Leu Gly Ser Tyr Lys Tyr Ile Gly  
85 90 95

Ala Ser Asp Asp Thr Ala Asn Asp Gly Tyr Tyr Lys Met Gly Leu Tyr  
100 105 110

Lys His Leu Val Lys Val Glu Ile Asp Lys Lys Gly Lys Ala Lys Lys  
115 120 125

Glu Leu Lys Tyr Leu Pro Phe Leu Ser Gln Lys Glu Tyr Leu Val Lys  
130 135 140

Val Tyr Thr Asp Leu Lys Lys Ile Asn Asn Cys Gln Glu Lys Lys Glu  
145 150 155 160

Glu Val Lys Leu Asp Tyr Lys Met Asp Glu Leu Tyr Lys Ser Lys Val  
165 170 175

Lys Ser Ser Gly Leu Leu Glu Lys Leu Met Ser Lys Leu Ile Glu Ser  
180 185 190

Lys Leu Ser Leu Leu Asn Val Gln Thr Gln Leu Met Ser Ser Glu His  
195 200 205

Cys Ile Asp Thr Asn Val Pro Asn Ala Ala Cys Tyr Arg Tyr Leu Asp  
210 215 220

Gly Thr Glu Glu Trp Arg Cys Leu Leu Phe Lys Glu Gly Lys Cys Val  
225 230 235 240

Pro Ala Asn Thr Cys Lys Asp Asn Gly Gly Cys Ala Pro Glu Ala Glu  
245 250 255

Cys Lys Met Asp Asn Ile Val Cys Lys Cys Thr Lys Glu Gly Ser Glu  
260 265 270

Pro Leu Phe Glu Gly Val Phe Cys Ser  
275 280

<210> 15  
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<212> PRT  
<213> Artificial Sequence

<220>  
<223> synthetic peptide

<400> 15

Leu Asn Val Gln Thr Gln  
1 5

*214  
concluded*